

REMARKS

Claim objections

The examiner objected to claims 16, 23, 27, and 29-65 as misnumbered. All of the pending claims have been canceled and claims corresponding to the previously pending claims have been added. The order of the claims also has been changed so that all claims depending from a given independent claim are grouped consecutively. The examiner requested that no reference be made to old claim numbering. However, in light of the reordering of the claims, the following claim chart is provided and contains the only reference to old claim numbers in this response:

New Claims	Original Claims (from Appendix to Brief for Appellant)
66-72	1, 3, 7, 9, 39, 60, 62
73-77	2, 40, 59, 60, 63
78-83	14, 64, 15, 21, 41, 65
84-86	16, 22, 23
87-97	26, 29-38
98-112	42-56
113-114	57-58

Rejection of pending claims

The examiner maintains the rejection of all pending claims as obvious over GB 2084586.

Response

-Background

The claims are directed to a simple, efficient, and effective method for prehydrating water-soluble polymers so that the resulting precursor polymer dispersion can be simply mixed with and effectively hydrated by a high density brine in the field. It is not necessary to use heat or added solvating agents.

Water-soluble polymers are difficult to hydrate using a high density brine. As explained in the specification,

The viscosity of a drilling or completion brine typically is maintained using polymers, such as starches, derivatized starches, gums, derivatized gums, and cellulose. Although these polymers are water-soluble, they have a relatively low hydration rate in brines because very little water actually is available to hydrate the polymers, particularly in high density brines.

Specification, p. 2, ll. 11-15.

The GB reference recognizes the foregoing issues, as demonstrated from the following quote:

Usually, upon the addition of one of the dry particulate hydrophilic polymers described above **to aqueous mediums such as brines**, the polymer particles undergo surface hydration preventing the interior of the particle from readily hydrating, solvating or otherwise dispersing in the aqueous medium. Accordingly, high shear, long mixing times and/or elevated temperatures must be applied in order to obtain a homogeneous system.

GB reference, p. 1, l. 62-p. 2, l. 2 (emphasis added). The GB reference attempts to solve this problem by adding the polymer directly to water and adding salt in a subsequent step. See discussion and citations below.

The claimed method solves the foregoing problem by mixing a relatively high concentration of water-soluble polymer with a precursor brine to form a precursor polymer dispersion in which the polymer has a desired level of prehydration. Because the polymer has the desired level of prehydration, simply mixing the precursor polymer dispersion with a high density brine provides a final brine with adequate rheology and filtration control. In preferred embodiments reflected in many of the claims, the water soluble polymer is prehydrated by mixing about 0.5-4 lb/gal, preferably about 1-2 lb/gal, of the desired water-soluble polymer with a multivalent brine having a density of about 9-14 lb/gal, preferably about 11-13 lb/gal. Specification, p. 6, ll. 15-18. See also claims.

-Response to examiner's comments

The examiner has not established a *prima facie* case of obviousness because the examiner has not pointed to any teaching or suggestion in the GB reference, or elsewhere, that ***the amount of polymer*** added to the precursor brine is a result effective variable. The arguments presented by the examiner in Paper 29 in support of the obviousness rejection focus on the density of the brine--not on the ***amount of polymer*** added to the precursor brine.

More specifically, the examiner has not established a *prima facie* case of obviousness of the claims because:

1. The examiner **has not established** that persons of ordinary skill in the art recognized ***polymer concentration*** in a "precursor polymer dispersion" to be a "**result effective variable**" [MPEP 2144.05(B)];
2. The examiner has not established either (a) **an overlap in *polymer concentration* ranges** between (i) the brines in GB 2 084 586 A and (ii) the precursor polymer dispersions of the claims, or (b) that the polymer concentrations described in (i) and (ii) are "close enough that one skilled in the art would have expected them to have the same properties." [MPEP 2144.05(I)];
3. The examiner has not pointed to a teaching or suggestion in the GB reference or elsewhere that would **motivate** a person of ordinary skill in the art to **increase *the amount of polymer added to a precursor brine*** in order to achieve a desired level of hydration of polymers in a precursor brine; and,
4. The GB reference actually **teaches away** from using brine as the initial contact solution for water-soluble polymers. This is "strong evidence of unobviousness." *In re Hedges*, 228 U.S.P.Q. 685, 687 (Fed. Cir. 1986), quoting *W. L. Gore & Assoc. v. Garlock, Inc.*, 220 U.S.P.Q.303, 312 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

DISCUSSION

1. **The examiner has not established that persons of ordinary skill in the art recognized *polymer concentration* in a “precursor polymer dispersion” to be a “result effective variable” [MPEP 2144.05(B)];**

“A particular parameter must first be recognized as a **result-effective variable**, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation.” [Citations omitted]. MPEP 2144.05.II.B. **The claimed invention is directed to the discovery that that the concentration of polymer in a “precursor polymer dispersion” is a “result effective variable.”**

The examiner has not pointed to any teaching or suggestion, in the GB reference or elsewhere, that the concentration of polymer in a “precursor polymer dispersion” is a “result effective variable.” The examiner therefore cannot establish *prima facie* obviousness merely by arguing that “it is not inventive to discover the optimum or workable ranges by routine experimentation.” Paper No. 29, pp. 4-5.

2. **The examiner has not established (a) an overlap in *polymer concentration* ranges between (i) the brines in GB 2 084 586 A and (ii) the precursor polymer dispersions of the claims, or (b) that the polymer concentrations described in (i) and (ii) are “close enough that one skilled in the art would have expected them to have the same properties.” [MPEP 2144.05(I)];**

The broadest range of polymer concentration specified in the claims is from about **0.5 to about 4 pounds per gallon** of precursor brine. The amount of polymer added to the “premade” brines in Examples 2 and 3 of the GB reference result in **0.046 pounds/gal of polymer (Example 2) and 0.048 lb/gal of polymer (Example 3)**. See EXHIBIT 1 to Reply Brief for calculations. The quantity of polymer added to the “premade” brines in Examples 2 and 3 of the

GB reference are at least a magnitude less than the concentrations specified in many of the claims.

The examiner also has not established that the controls in Examples 2 and 3 meet the functional limitation that:

addition of a sufficient quantity of said precursor polymer dispersion to a final brine comprising an aqueous solution of a second salt at a final density produces a final polymer dispersion comprising a second concentration comprising final particles of said water-soluble polymer at a final level of hydration, **said second concentration and said final level of hydration being effective at downhole conditions to maintain an effective level of a property of said final brine selected from the group consisting of rheology, fluid loss control, and a combination thereof.**

Claim 1 (emphasis added). Similar limitations are present in a number of claims.

In this regard, Applicant particularly directs the examiner's attention to the statements in the GB reference negatively comparing the controls of Examples 2 and 3 to the "brines prepared by the method of the invention" of the GB reference-- where "approximately 2 g of the polymer was mixed in 204.4 g water" (Examples 1 and 2, Tables 1 and 2). The GB reference states that the "brines prepared by the method of the invention . . . exhibit superior viscosity and give lower filtrates in every case before hot rolling." GB reference, p. 3, ll. 44-45. See also the values listed under "API FIL" in Tables 1 and 2 compared those listed under "API FIL" in Table 3 (GB reference, p. 3, l. 18-54). Applicant also directs the examiner's attention to the statement in Example 3 of the GB reference, that "the apparent viscosities of the brines prepared by the method of the invention have values twice as large or more than the controls. The superior filtration properties of the samples prepared by the method of the invention are readily evident as well from a comparison of these data." GB reference, p. 4, ll. 31-33. See also Tables 6 and 7.

As seen from the foregoing, the examiner has not established either an overlap in the

polymer concentration ranges required by the claims and those in the “controls” of Examples 2 and 3 of the GB reference. Nor has the examiner established that the range of claimed polymer concentrations and the polymer concentrations in the controls in Examples 2 and 3 of the GB reference are “close enough that one skilled in the art would have expected them to have the same properties.” MPEP 2144.05 (I).

The examiner nevertheless concludes that the claimed polymer concentration in the precursor brine is *prima facie* obvious because “[g]enerally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical.” Applicant is not required to show “criticality” where the examiner has not established a case of *prima facie* obviousness.

3. The GB reference Teaches Away from the Claimed Invention.

In light of the poorer results achieved using the controls, of Examples 2 and 3, the GB reference teaches away from using a brine as the initial contact solution for water-soluble polymers. This factor is “strong evidence of unobviousness” of the claims. *In re Hedges*, 228 U.S.P.Q. 685, 687 (Fed. Cir. 1986), quoting *W. L. Gore & Assoc. v. Garlock, Inc.*, 220 U.S.P.Q.303, 312 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Rather than motivating a person of ordinary skill in the art to increase the amount of polymer added to a precursor brine, the GB reference would motivate a person of ordinary skill in the art to add polymer to water instead of a brine to form a “precursor polymer dispersion.”

The “latter embodiment” on page 2 of the GB reference does not teach what the examiner contends

The examiner contends that “[t]he GB reference teaches adding brine to a polymer to make a polymer dispersion and then adding the polymer dispersion to another brine solution resulting in a brine having a higher concentration.” In support of this contention, the examiner points to Examples 2 and 3 of the GB reference (discussed above), and “a latter embodiment in lines 35-45” on page 2 of the GB reference.

The cited portions at page 2 of the GB reference do not teach what the examiner contends. Lines 35-45 of the GB reference read as follows: “[i]n this latter embodiment of the method of the present invention, the polymer, water and inorganic salt are mixed **as above** to hydrate the polymer and form the polymer/water suspension.” (Emphasis added). The method described “above” is: “the hydrophilic polymer and water as, for example, fresh water, distilled water, etc., are admixed under conditions so as to provide a uniform dispersion of the polymer in the water.” GB reference, p. 2, ll. 5-3. **“In the next step of the method, an inorganic salt(s) is added in dry form, to the suspension of the polymer and water.”** GB reference, p. 2, ll. 14-15.


Page 2 of the GB reference does not support the examiner’s arguments.

CONCLUSION

Applicant respectfully requests entry of the amendments and reconsideration and allowance of all of the pending claims. The Commissioner is hereby authorized to charge any

fees in connection with this response, or to credit any overpayment, to Deposit Account No. 02-0429 maintained by Baker Hughes Incorporated.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paula Morris", written over a horizontal line.

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